Power Drive. Battery-driven power tool system for orthopaedics and traumatology.

User's Manual

SYNTHES®

Instruments and implants
approved by the AO Foundation

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Power Drive (530.100)

– Variable speed: 0–750 rpm
– Weight, including battery: 1,750 g
– Torque: 4.5 Nm
– Cannulation: 3.2 mm diameter

Attachment release ring
Allows easy exchange of attachments

Attachment coupling
Accepts a wide variety of attachments

Instant-reverse trigger
Reverses rotation to counterclockwise direction

Variable-speed trigger
Controls rotational speed

Battery casing
Simple twist-off design allows easy intraoperative battery exchange. Holds battery in sterile environment

Safety lock
Turns drive off for safe attachment exchange

This device complies with the following standards:
UL 2601-1
EN 60601 (IEC 601-1)
EN 60601-1-1 (VDE 0750 part 1 and 2)
EN 55011 (VDE 0875 part 11)
Limiting values of class B, group 1

Battery and Charger

Battery (530.200)

– Voltage: 12 VDC
– Capacity: 1.0 Ah
– Type: NiCd
– Charging time: 80 minutes maximum
– Working temperature range: 0° to 50° C (32° to 122° F)
– Discharge protection: Prevents total battery discharge, eliminating memory effect, maintaining battery capacity, and increasing battery life

Important: Do not sterilize batteries! Batteries will no longer function.

Universal Battery Charger (530.601)

– Four charging bays accept Small Battery Drive, Power Drive and Battery Power Line batteries
– One (1) battery can be placed in each charging bay allowing a maximum of four (4) batteries to be charged at the same time

Complies with standards:
UL 60950
IEC 60950
EN 55022 class B
EN 61000-3-2, 3
EN 61000-4-2, 3, 4, 5, 6, 11

Attachments for Power Drive

511.731 Jacobs Chuck, Keyless
– Accepts K-wires and Steinmann pins with round shafts from 1.0 mm to 6.0 mm in diameter or triangular shafts up to 6.5 mm

511.75 Quick Coupling, for drill bits
– Accepts quick coupling drill bits
– Allows use of Oscillating Drill Attachment (511.20) and Radiolucent Drive (511.30)

511.761 Large Quick Coupling
– Accepts DHS and DCS triple reamers and large quick coupling cannulated drill bits

511.785 Reduction Drive Unit
– Allows direct medullary reaming with flexible shafts
– Reduces maximum speed to 270 rpm
– Increases maximum output torque to 12.5 Nm
– Automatically locks reverse trigger to prevent damage to wound reaming shafts
– Accepts reaming rods up to 3.2 mm in diameter

511.786 Reduction Drive Unit with Reverse
– Allows direct medullary reaming with flexible shafts
– Reduces maximum speed to 270 rpm
– Increases maximum output torque to 12.5 Nm
– Accepts reaming rods up to 3.2 mm in diameter

511.791 Quick Coupling for K-Wires

– For insertion of K-wires from 0.6 mm to 3.2 mm in diameter
– Allows use of any length K-wire

511.801 Oscillating Saw Attachment II

– Keyless quick coupling for saw blades allows quick intraoperative blade exchange
– Saw blade oscillates 4.5° for optimal cutting performance
– Accepts standard or aggressive tooth saw blades

Connect the charger to the electrical cord, and plug the cord into a 110/120 VAC outlet.

Turn on the charger by pressing the power switch to ON. All LEDs on the status indicator panels will illuminate (red, yellow and green) when the charger is empty and ready to charge (Figure 1).

Insert the battery into one of the appropriate charging bays. Only the yellow LED should remain illuminated, indicating that the battery is charging (Figure 2).

When the green LED illuminates, the battery is fully charged and operational (Figure 3). The battery should be left in the charging bay until needed.

The battery can be removed during the charging process; however, the battery may not be fully charged and operational duration may be shorter.

Important:
Always leave the charger switched on when a battery is inserted in a charging bay. Leaving a battery in the charger when it is switched off or unplugged may permanently discharge the battery.

Never attempt to insert more than one battery in the same charging bay.

Note: If LEDs do not follow this sequence, refer to the troubleshooting section, page 23.

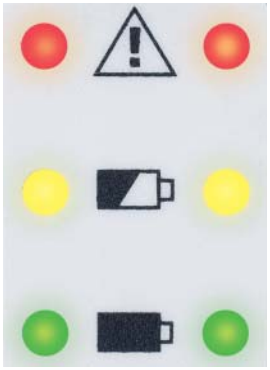


Figure 1

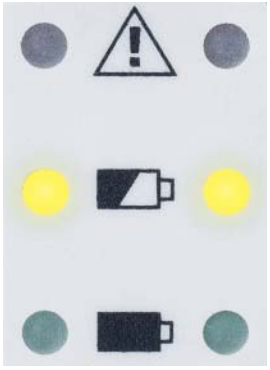


Figure 2

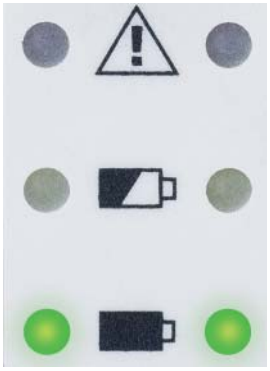


Figure 3

Assemble battery pack

Instruments	
530.250	Battery Insertion Shield
530.280	Battery Casing

Inserting the battery into the casing and preserving the sterile field requires one scrubbed nurse/operating room technician and one circulating nurse.

Scrubbed person

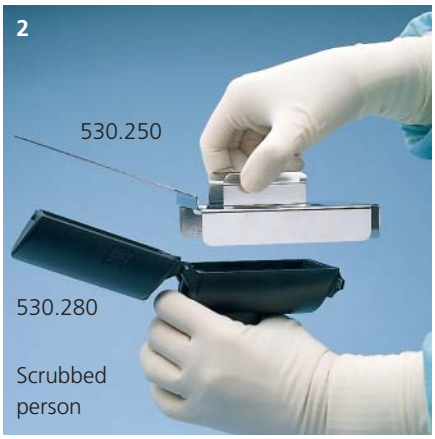
1 Hold the sterilized battery casing. Open the lid by depressing the silver switch and rotating the latch counterclockwise.

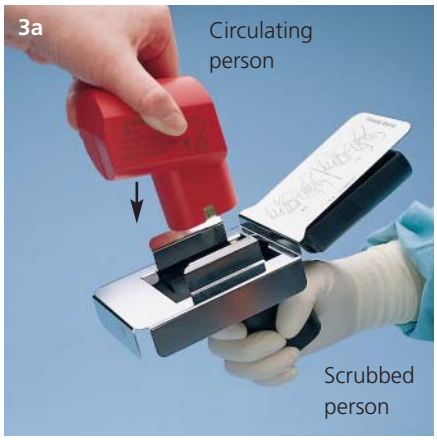
2 Place the sterilized battery insertion shield on the battery casing. The insertion shield helps guide the battery into the case, ensuring that the nonsterile battery does not contaminate the outside of the sterilized battery casing.

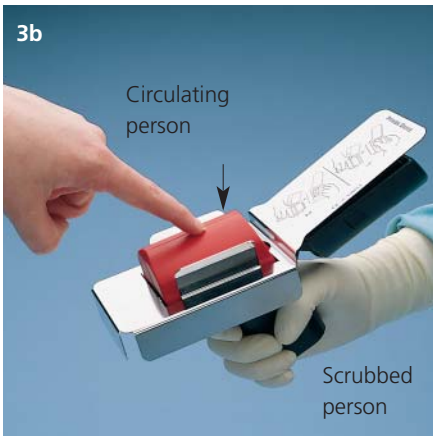
Circulating person

3 Carefully insert the (nonsterile) battery into the battery casing and press firmly until it engages. The battery design guarantees correct positioning of the charging poles on insertion.

Note: Do not sterilize batteries! Batteries will no longer function.







Assemble battery pack continued

Circulating person

4 Remove the battery insertion shield.

Scrubbed person

5 Close and lock the battery casing lid without touching the battery or the inside of the battery casing. Rotate the latch clockwise to a vertical position until you hear the safety lock engage.

Note: Although one battery is usually sufficient for one operation, two battery packs (battery casing with inserted battery) should always be prepared to ensure a quick intra-operative battery pack exchange under sterile conditions.

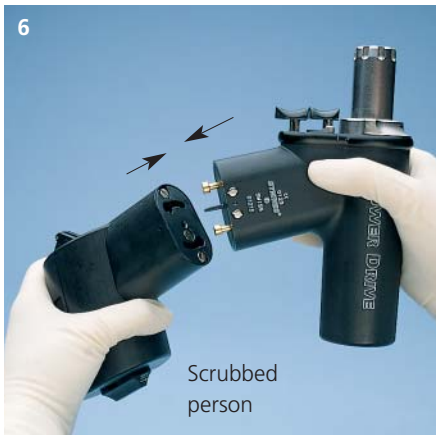
Install battery pack

6 Turn the battery pack (battery casing with inserted battery) clockwise to couple it to the lower part of the power drive, via the locating posts at the base of the handle. The geometry prevents incorrect coupling.

Remove battery pack

Turn the battery pack counterclockwise to uncouple it.

Note: Installing the battery pack just before use extends the life of the battery and minimizes intraoperative battery exchange.



Speed control

For forward (clockwise) rotation, press the variable-speed (bottom) trigger of the power drive.
For reverse (counterclockwise) rotation, press both triggers. Speed correlates directly to the amount of pressure on the variable speed trigger and can be varied continuously from 0 to 750 rpm.

Safety lock

The power drive has a safety lock which prevents the drive from being accidentally started.

Important: The safety lock must be in the "UNLOCK" position to operate the drive.

Important: To prevent injuries, the safety lock should always be switched to the "LOCK" position when inserting or removing an instrument.

Insert an attachment
Insert the attachment into the power drive attachment coupling until the parts engage. It is not necessary to operate the attachment release ring for insertion. Ensure that the attachment is correctly held in the coupling by pulling on it slightly.

Remove an attachment
Turn the release ring and remove the attachment.
Do not pull on the attachment while turning the ring.

Quick Coupling for K-Wires (511.791)
For insertion of K-wires from 0.6 mm to 3.2 mm in diameter (see page 10 for installation and removal of attachments).

Important: To prevent injuries, the safety lock should always be switched to the "LOCK" position when inserting or removing an instrument.

Insert a K-wire into the quick coupling for K-wires
Completely open the adjusting sleeve at the end of the attachment. Insert the K-wire and close the adjusting sleeve until it clamps the wire. Then open the adjusting sleeve three clicks. The K-wire is lightly held in the selected position.

Note: Ensure K-wire is centered in cannulation prior to tightening the adjusting sleeve.

Insert a K-wire into bone
Grasp the K-wire by pulling the lever against the handpiece, and press the lower (forward) trigger.

Remove a K-wire from bone
Open the adjusting sleeve of the attachment completely. Slide the drive unit and coupling over the K-wire. Close the adjusting sleeve until it clamps the wire. Then open the adjusting sleeve three clicks. Grasp the wire by squeezing the lever toward the handpiece and press both triggers (reverse) simultaneously to remove the wire from the bone.

Quick Coupling, for drill bits (511.75)

– Accepts quick coupling drill bits and screwdriver shafts.
– Allows use of Oscillating Drill Attachment (511.20) and Radiolucent Drive (511.30)

Large Quick Coupling (511.761)

Accepts DHS and DCS triple reamers and large cannulated drill bits (see page 10 for installation and removal of attachments).

Important: To prevent injuries, the safety lock should always be switched to the "LOCK" position when inserting or removing an instrument.

Insert an instrument

Push the collar of the quick coupling forward and insert the instrument shaft completely with a slight rotation to align the keyway. When the shaft is fully inserted, release the collar. Pull slightly on the instrument to ensure that it is held securely.

Remove an instrument

Push the collar of the quick coupling forward to release the instrument.

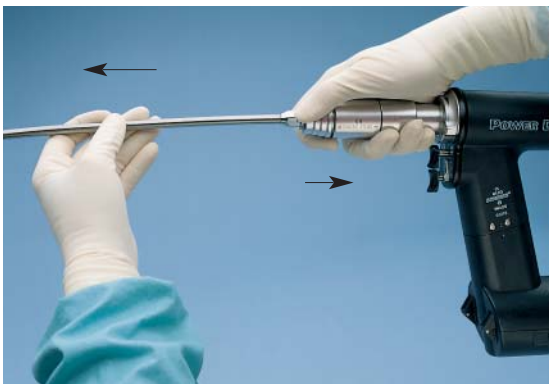
Reduction Drive Unit (511.785)
- Allows intramedullary reaming with flexible shafts and reaming rods
- Automatic locking of reverse trigger prevents damage to wound shafts

Reduction Drive Unit with Reverse (511.786)
Allows intramedullary reaming with flexible shafts and reaming rods.

See page 10 for installation and removal of attachments.

Insert an instrument
Insert the instrument shaft into the opening until it engages.

Remove an instrument
Retract the collar of the quick coupling to release the instrument.



Jacobs Chuck, keyless (511.731)
Accommodates instruments, K-wires and Steinmann pins with round shafts from 1.0 mm to 6.0 mm, or triangular shafts up to 6.5 mm.

See page 10 for installation and removal of attachments.

Insert an instrument
Open the chuck jaws by grasping the collar and turning the main body clockwise. Insert the instrument into the opened chuck. Close the chuck by turning the main body counter-clockwise.

Remove an instrument
Turn the main body clockwise to open the chuck jaws. Remove the instrument.

Important: To prevent injuries, the safety lock should always be switched to the "LOCK" position when inserting or removing an instrument.

Oscillating Saw Attachment II (511.801)
Accepts standard and aggressive tooth saw blades.

Important: To prevent injuries, the safety lock should always be switched to the "LOCK" position when inserting or removing an instrument.

Insert a saw blade into the oscillating saw attachment II

1 Position the attachment. The saw attachment can be locked in 8 different positions in 45° increments. To reposition the saw attachment, remove the attachment from the power drive and reattach at the desired position.

2 Turn the locking knob counterclockwise to open blade mount.

3 Insert saw blade into the blade coupling and adjust to the desired position. The blade can be locked in different positions at 45° increments.

4 Close the coupling by turning the locking knob clockwise.

Remove the saw blade

Open the blade coupling and remove the saw blade.

See page 10 for installation and removal of attachments.

Care and Maintenance

Regular care and maintenance according to the following guidelines can significantly increase the reliability and life span of the system. Synthes recommends annual preventive services. Yearly maintenance will ensure that the equipment maintains the highest standard of performance and will prolong the life of the system.

Important: Disassemble battery pack and return batteries to charger immediately after each use. **Do not disinfect, immerse, or sterilize batteries.** Batteries may be wiped with a cloth.

– Before cleaning and sterilization, remove attachments, instruments and cutting tools from the drive units.
– Cleaning and lubrication should be performed immediately after each use.
– Clean the drive units, attachments and battery casings by hand. **Never immerse or clean in an automatic washer or ultrasonic cleaner.**
– Use a mild, neutral pH cleaning solution.

Caution: Do not sterilize batteries! Batteries will no longer function.

Cleaning batteries and universal battery charger
To clean batteries and charger, wipe with a soft cloth.

Important: Do not use solvents to disinfect the batteries. Battery poles must not contact water or solvents: Danger of short circuiting!

Cleaning the power drive

Important: Disassemble battery pack and return batteries to battery charger immediately after each use. Do not disinfect, immerse, or sterilize batteries. Batteries may be wiped occasionally with a soft cloth.

Before cleaning, manipulate all moving parts under running water to loosen and remove debris. Open and close chucks, and move quick couplings back and forth.

1
Remove debris

Manually remove blood and debris from the drive and attachments under running water. Use a mild cleaning solution and a soft brush or cloth. **Do not allow water to enter the drive unit.**

2
Disinfect

Wipe or spray the drive unit, battery casing, and attachments with disinfectant.

3
Rinse

Remove all residues from the disinfected drive unit, battery casing, and attachments under running water using a soft brush or cloth.

4
Clean cannulations

Instrument	
519.40	Cleaning Brush

Clean cannulations of the drive unit and attachments with the cleaning brush.

Note: The quick coupling for K-wires must be fully open to the largest diameter setting before inserting the brush.

5
Dry all components

Dry the drive unit and attachments with a soft cloth.

Lubricating

Instrument	
519.97	Synthes Autoclavable Oil

Use only Synthes autoclavable oil to lubricate the power drive and attachments. Lubricate the attachments after every cleaning and before sterilization. The drive unit should only be oiled if resistance is noted in the triggers, attachment coupling site, or release ring.

Important: NEVER lubricate the radiolucent drive.

Lubricate all moving parts of the attachments with one to two drops of oil. Operate the parts to distribute the oil, and wipe off the excess oil.

Periodically, apply one drop of Synthes autoclavable oil onto each trigger shaft and move it a few times. Also lubricate the attachment release ring.

Cleaning battery and battery charger
To clean battery, wipe with a soft cloth.

Important: Do not use solvents to disinfect the batteries. Battery poles must not contact water or solvents: Danger of short circuiting!

Battery storage and charging
After cleaning, insert the batteries into the charger. The charger continuously monitors the battery level and automatically recharges as necessary. This ensures that the batteries are fully charged and ready for use at any time. When batteries occupy all charger bays, extra batteries can be stored in a cool dry place. Before the next use, the batteries must be charged.

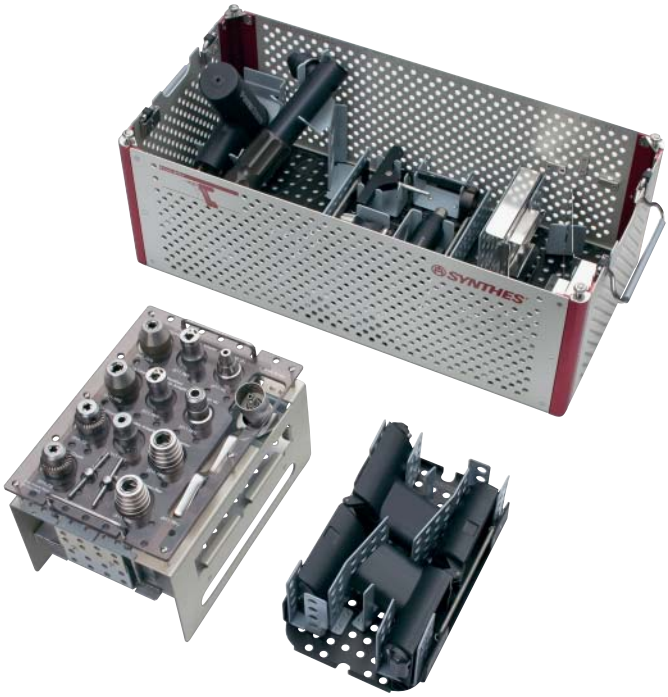
Important:
After prolonged storage of the batteries outside the charger, two or three charging cycles may be necessary to achieve full battery capacity.

Always leave the charger switched on when a battery is inserted in a charging bay to ensure permanent availability and prevent discharge.

Sterilization

To sterilize the Power Drive and attachments:
- Disassemble all parts, including attachments, adaptors, instruments and battery packs
- Remove battery pack from drive unit
- Remove battery from casing.
  Battery casing must be open for sterilization

Note: Do not sterilize batteries! Batteries will no longer function.



The Synthes Power Drive Set should be steam sterilized in the graphic case in accordance with the following guidelines:

Wrapped	Temperature	Minimum Exposure Time
Prevacuum	132°–135°C (270°–275°F)	24 minutes

Unwrapped (Flash)		
Prevacuum	132°–135°C (270°–275°F)	24 minutes

Times represent exposure times only, and not total cycle times.

Important: Do not accelerate the cooling process. A thermal overload circuit prevents drive unit operation when the drive unit is overheated. After cooling to room temperature, the drive unit should function. Hot air and ethylene oxide gas (ETO) sterilization are not recommended.

Troubleshooting — Drive Units and Attachments

Problem	Possible Causes	Remedy
Machine does not start.	Safety lock may be in the LOCK position.	Set LOCK to UNLOCK.
	No electrical contact between drive unit and battery casing.	Reattach or change battery casing.
	Battery is drained.	Charge or replace battery.
	Drive unit has not cooled after sterilization.	Allow drive unit to cool to room temperature.
Machine lacks power.	Battery is drained.	Charge or replace battery.
Machine suddenly stops.	Battery is drained.	Charge or replace battery.
	Drive unit has overheated.	Allow drive unit to cool to room temperature.
Machine continues to run after trigger is released.	Trigger is jammed by residue.	Immediately turn the safety lock to LOCK. Operate trigger several times, clean, and oil according to instructions. (Use only Synthes autoclavable oil.)
Attachments cannot couple to drive unit.	Coupling is blocked by residue.	Engage safety lock. (Do not use sharp tools. Remove solid particles with pickups.)
Difficulty removing attachments from drive unit.	Release inhibited by pulling on attachment while turning attachment release ring.	Turn attachment release ring before attempting to remove attachments.
Cannot attach instrument or difficulty attaching instruments.	Attachment or instrument excessively worn.	Replace attachment or instrument.
K-wire completely inserted into coupling, cannot be advanced.	K-wire inserted incorrectly into rear of machine.	Disconnect quick coupling, hold drive unit with opening down, and shake out K-wire. (Set safety lock to LOCK.)

Troubleshooting—Batteries and Universal Battery Charger

Problem	Possible Causes	Remedy
Drive unit lacks power.	Battery is drained.	Charge or replace battery.
	Battery is not fully charged.	Charge or replace with a fully charged battery.
	Battery cannot be fully charged.	Replace battery.
Battery is physically damaged	Battery has been dropped from height.	Replace battery.
	Battery was autoclaved.	Replace battery.
Before inserting battery into charger, LEDs do not illuminate.	Battery charger is switched OFF.	Switch battery charger to ON.
	Electrical cord is not plugged in.	Plug in cord.
	Fuse is blown.	Call Synthes Service Department.
	Battery charger requires service.	Return charger to Synthes Service Department.
When battery is inserted into charger, red LED illuminates.	Battery is not correctly inserted.	Remove battery and insert again.
	Battery cannot be fully charged.	Replace battery.
After battery is inserted into charger, red LED flashes.	Battery type could not be identified.	Remove battery and insert again.
	Battery is warm.	Leave battery in charger. When the battery begins cooling, the yellow LED will illuminate and the red LED will flash. After the battery has cooled down, the red LED will stop flashing and the charging process will start automatically.
During the charging cycle, the red LED flashes and yellow LED illuminates.	Battery is warm.	Leave battery in charger. After the battery has cooled down, the red LED will stop flashing and the charging process will start automatically.
See page 6 for universal battery charger operating instructions.	*If the suggested solutions are unsuccessful, please contact the Synthes Service Department at 1 (800) 288-6698.*	*Synthes recommends an annual preventive maintenance service by qualified Synthes personnel.*

Power Drive Set (105.957)

Graphic Case

60.550.020	Graphic Case Base Assembly
60.550.021	Lid
60.550.024	Insert tray for Battery Casings
60.550.032	Attachment Rack
60.550.033	Insert tray for Saw Attachments

Note: Graphic case components must be ordered individually for complete graphic case assembly.

60.555.020

Instruments

511.731	Jacobs Chuck, keyless
511.75	Quick Coupling, for drill bits
511.761	Large Quick Coupling
511.785	Reduction Drive Unit
511.791	Quick Coupling for K-Wires
511.801	Oscillating Saw Attachment II
530.100	Power Drive
530.200	Battery, 2 ea.
530.250	Battery Insertion Shield, 2 ea.
530.280	Battery Casing, 2 ea.
530.601	Universal Battery Charger, 4 Bays

60.555.024

60.555.032

60.555.033

530.601

Also Available

511.20	Oscillating Drill Attachment
511.30	Radiolucent Drive Mark II
511.73	Jacobs Chuck, with key
511.782	Hudson Adaptor
511.783	Modified Trinkle Adaptor
511.784	Trinkle Adaptor
511.786	Reduction Drive Unit with Reverse
511.80	Oscillating Saw Attachment
511.902	Reciprocating Saw Attachment
511.904†	Sternum Top for Reciprocating Saw Attachment

Service and Extended Warranty Programs

W1.105.957	Annual Service and Extended Warranty for Power Drive Set
W3.105.957	Three-Year Service and Extended Warranty for Power Drive Set

Saw Blades for Reciprocating Saw Attachment, sterile (511.902)

	Cutting Length (mm)	Cutting Thickness (mm)
511.905S	80	1.05
511.906S	70	1.27
511.907S	55	1.05
511.909S	55	0.85
511.912S*	68	1.10
511.913S*	68	1.00
511.914S*	68	0.80
511.915S**	40	1.10

511.905S

511.907S

511.909S

511.912S

† Use with Reciprocating Saw Blade (511.915S)
* Double-sided
** Use with Sternum Top for Reciprocating Saw Attachment (511.904)

Saw Blades for Oscillating Saw Attachment II (511.801)

Saw blades with aggressive tooth, calibrated, sterile*

	Blade Width (mm)	Calibrated Length (mm)	Cutting Thickness (mm)
05.002.201S	12.5	90	0.89
519.118S	12.5	90	0.90
05.002.405S	12.5	90	1.00
05.002.202S	12.5	90	1.19
05.002.203S	12.5	90	1.27
05.002.204S	12.5	90	1.37
05.002.205S	12.5	90	1.47
05.002.006S	19	80	0.89
05.002.001S	19	95	0.89
519.107S	19	95	0.90
05.002.007S	19	95	1.00
05.002.008S	19	95	1.07
05.002.002S	19	95	1.19
519.114S	19	95	1.25
05.002.003S	19	95	1.27
05.002.004S	19	95	1.37
519.116S	19	95	1.40
05.002.005S	19	95	1.47
05.002.301S	19–12.5**	90	0.89
05.002.306S	19–12.5	90	1.00
05.002.302S	19–12.5	90	1.19
05.002.303S	19–12.5	90	1.27
05.002.304S	19–12.5	90	1.37
05.002.305S	19–12.5	90	1.47
05.002.501S	25	60	0.89
519.109S	25	60	0.90

519.118S

05.002.001S

05.002.302S

519.109S

*Please contact your Synthes Sales Consultant or Customer Service for additional information. Illustrations not to scale.

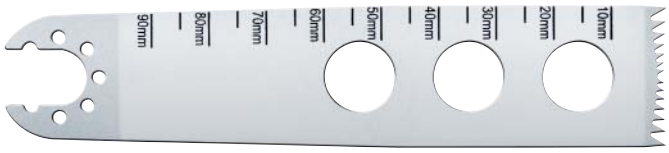
**Blade width – Shaft width

Saw Blades for Oscillating Saw Attachment II (511.801)

continued

Saw blades with aggressive tooth, calibrated, sterile* continued

	Blade Width (mm)	Calibrated Length (mm)	Cutting Thickness (mm)
05.002.101S	25	95	0.89
519.108S	25	95	0.90
05.002.106S	25	95	1.00
05.002.107S	25	95	1.07
05.002.102S	25	95	1.19
519.115S	25	95	1.25
05.002.103S	25	95	1.27
05.002.104S	25	95	1.37
519.117S	25	95	1.40
05.002.105S	25	95	1.47
05.002.401S	25	85	1.47



05.002.101S

Saw blades, calibrated, sterile.*

519.230S	6	25	0.6
519.103S	10	25	0.6
519.104S	10	50	0.6
519.250S	14	25	0.6
519.150S	14	50	0.6
519.113S	18	70	1.2
519.106S	19	70	1.0
519.105S	20	50	0.6
519.100S	27	50	0.6
519.170S	27	70	0.8
519.200S	27	70	1.0
519.210S	27	70	1.2
519.190S	50	70	0.8

519.106S

519.170S

519.230S

*Please contact your Synthes Sales Consultant or Customer Service for additional information. Illustrations not to scale.

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